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# Vapours and aerosols arising from cooling lubricants

## Problem

Cooling lubricants may give off harmful vapours and aerosols when handled. Cooling lubricant emissions arise for example when cooling lubricants are splashed or when mists form, or when they are flung off by rotating tools and workpieces. Vaporization of cooling lubricants, primarily on hot or overheating surfaces of workpieces, tools, chips, etc. but also on catch pans and floors, also leads to cooling lubricant emissions (see illustration, top). All emissions processes produce fine or coarse aerosols and vapours.

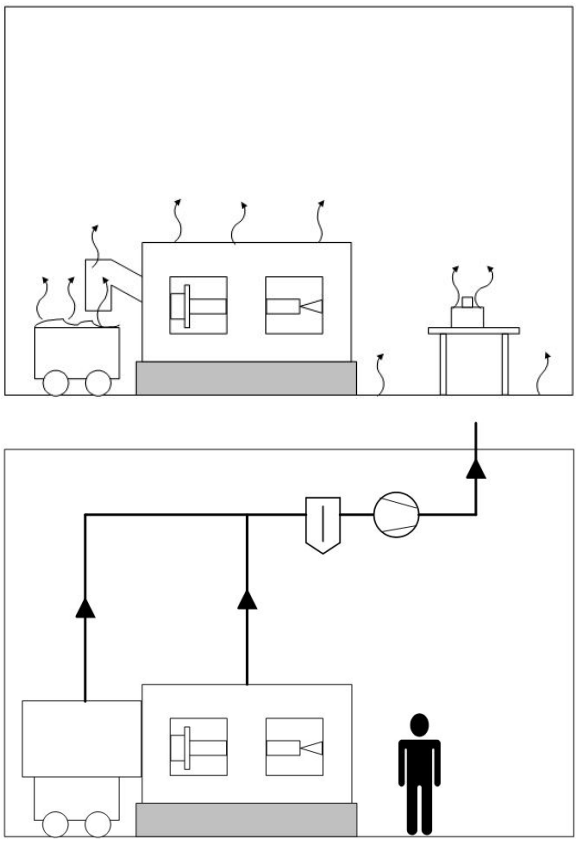
## Activities

Comprehensive in-plant studies provided the basis for development of a strategy for protective measures.

## Results and Application

The following were identified as being among the causes of vaporization of cooling lubricants:

- poor cooling lubricant flow;
- poor direction of the cooling lubricant flow onto the machining point;
- incorrect choice of cooling lubricants or cooling lubricant constituents;
- vaporization on hot workpieces or chips.



Emissions of cooling lubricants (top), capturing of cooling lubricant emissions (below)

Part of the vaporized cooling lubricant condenses to form fine aerosols. Sources of emissions can be reduced or limited in number by proper planning and organization of working areas. This applies in particular to diffuse sources of emission which are caused by improper handling of cooling lubricants, such as careless spraying.

Technical protective measures:

- The strategy for capture of cooling lubricant emissions is to encompass all emission sources. In addition to the machining area itself, these sources are primarily the exit points for workpieces or tools and chips, collecting trays for chips and cooling lubricant, temporary storage areas for workpieces and semifinished products, launders, etc. (see illustration, below).

- The technical measures concern, on the one hand, facilities for capturing and filtering emissions from cooling lubricants and for room ventilation; on the other, facilities for maintenance and care of cooling lubricants and the systems and their ancillary equipment.

Organizational protective measures:

- Chips and workpieces should be stored in the working area only briefly, and preferably not at all.

- Spilt or splashed cooling lubricant should be cleaned up regularly and as frequently as possible.

- All collecting and drain points should be kept closed.

- Leaks from housings or piping systems should be prevented, i.e. sealed immediately.

Besides the avoidance of emissions, care in maintenance of the installations and cooling lubricants can reduce the risk to health posed by the latter.

**Area of Application**

Metalworking businesses in the industrial and trade sector; glass industry

**Additional Information**

- Einsatz von Kühlschmierstoffen bei der spanenden Metallbearbeitung. BGIA-Report 4/2004. Hrsg.: Hauptverband der gewerblichen Berufsgenossenschaften (HVBG), Sankt Augustin 2004, www.dguv.de/webcode/d6377

- Absaugen und Abscheiden von Kühlschmierstoffemissionen. BGIA-Report 9/2006. Hrsg.: Hauptverband der gewerblichen Berufsgenossenschaften (HVBG), Sankt Augustin 2006, www.dguv.de/webcode/d6187

- VDI 3802-2: Air conditioning systems for factories – Capture of air pollutants at machine tools removing material (03.12). Beuth, Berlin 2012

- Portal Kühlschmierstoffe: www.dguv.de/ifa/kss

**Expert Assistance**

IFA, Division 3: Hazardous substances: handling – protective measures

German Social Accident Insurance Institution for the woodworking and metalworking industry, Mainz

German Social Accident Insurance Institution for the energy, textile, electrical and media products sector, Cologne

**Literature Requests**

IFA, Central Division

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